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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/528,883

03/23/2005

Kenji Koizumi

2005-0340A

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EXAMINER

LEADER, WILLIAM T

ART UNIT

PAPER NUMBER

1795

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/528,883	Applicant(s) KOIZUMI ET AL.	
	Examiner WILLIAM T. LEADER	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/23/05; 3/26/07</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. In the preliminary amendment filed on March 23, 2005, applicant amended claim 4 and added new claim 5. Claims 1-5 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claim 2 recites that the vessel is designed “in consideration of criticality control with geometrical control”. The meaning of this limitation and its impact on the structure of the claimed apparatus are unclear.
5. Claim 2 recites that the annular anode and the rod-shaped cathodes are arranged vertically. The geometrical arrangements included in the scope of this limitation are not clear. As shown in figure 3, annular anode 40 appears to be arranged horizontally. Is the limitation intended to refer to the relative placement of the annular anode and the rod-shaped cathodes?
6. Claim 4 recites that the parallel pair of the electrodes is used for auxiliary electrolysis whose role is to suppress the ununiform uranium oxide electrodeposition. The scope of this limitation is not clear. What electrolytic procedures are considered to suppress nonuniform uranium oxide electrodeposition?

7. Claim 4, line 11 recites “a MOX recovery step.” It is not clear what “MOX” stands for. Additionally, it is not clear if this step is in addition to the recovery of uranium oxide recited in line 6. That is, are two separate steps of recovery performed? The main electrolysis recited in lines 8-9 involves deposition of uranium oxide using the vertical pair of electrodes. However, the main electrolysis recited in line 13 involves deposition of MOX but uses the parallel pair of electrodes. It is not clear why the main electrolysis uses the vertical pair of electrodes in one case, but the parallel pair of electrodes in the other case.

8. Claim 4, lines 11-12 refer to “the oxides of uranium and plutonium”. This expression lacks antecedent basis.

9. Claim 4, lines 14-15 refer to “the electrodeposit fallen down from the cathodes.” This expression lacks antecedent basis. It is not clear why the electrodeposit falls from the cathodes.

10. Claim 5 is the same as claim 4 except that it is dependent on claim 3 rather than claim 2. The rejections in paragraphs 6-9 above are applied to claim 5 in the same manner as to claim 4.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Sharma (US 5,427,657).

13. The Sharma patent is directed to electrolytic apparatus. The embodiment shown in figure 2 includes a vessel 102, a plurality of anodes different in shape and arrangement (elements 110 and 132) and a common cathode (element 112). All structural elements recited in applicant's claim 1 are disclosed by Sharma. As explained in MPEP section 2114, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. A claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al (US 6,793,894) in view of Gay et al (US 5,650,053).

17. The Hayashi et al patent is directed to pyrochemical reprocessing of spent nuclear fuel. One embodiment of the apparatus used is shown in figures 1a and 1b. The apparatus includes crucible 2, high frequency induction coil 3, a rod-shaped cathode 11, a rod-shaped anode 12, and a DC power source 14 connected to the anode and cathode. See column 3, lines 3-37. Hayashi discloses that the crucible may have various shapes (column 4, lines 1-2). Figure 4 shows a crucible having an annular shape. This corresponds to the annular electrolytic vessel recited by applicant. The apparatus of Hayashi provides for improvement of the corrosion-resistant property of the crucible (abstract)). Hayashi discloses all elements of the apparatus recited in claim 2 except for the annular anode installed at the bottom of an annular space.

18. While applicant's claim 2 recites elements as anodes and cathodes, the claim does not recite a power supply or electrical connections which in use actually cause the elements to function as anodes or cathodes. Thus, while applicant recites anodes and cathodes, in the absence of a power supply and appropriate electrical connections, these elements may be considered to be any electrically conductive material which, if connected to a power supply, can function as an anode or cathode. Any electrical conductor in a vessel may potentially function as an anode or cathode if it is appropriately connected. The Gay et al patent is directed to an electrorefining cell for refining spent nuclear fuel. Gay et al discloses that uranium from the

spent nuclear fuel is deposited on cathodes 12 and 14. Scraper elements 58 are provided to remove deposited uranium from the cathodes. The removed uranium material collects on a bottom screen in the lower portion of the cell. It is noted that applicant's claim 4, line 15 refers to electrodeposits fallen down from the cathodes.

19. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have performed a process of refining spent uranium-containing nuclear fuel and collecting deposited uranium from the bottom of the cell as disclosed by Gay using the annular apparatus of Hayashi because the Hayashi apparatus provides an improvement in the corrosion-resistant property of the crucible. The uranium at the bottom of the cell would have been capable of functioning as an anode. This is all that is required by applicant's claim.

20. With respect to claim 3, Gay teaches that the uranium may be deposited on the surface of a rotating cathode (column 2, lines 18-21).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM T. LEADER whose telephone number is (571) 272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William Leader/
March 23, 2009

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795